



FACT SHEET



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HISTORY OF THE BALLISTIC MISSILE DEFENSE ORGANIZATION

"Tonight, consistent with our obligations under the ABMTreaty and recognizing the need for close consultation with our allies, I am taking an important first step. I am directing a comprehensive and intensive effort to define a long-term research and development program to begin to achieve our ultimate goal of eliminating the threat posed by strategic nuclear missiles... Our only purpose - one all people share - is to search for ways to reduce the danger of nuclear war."

- President Ronald Reagan, 23 March 1983

The Ballistic Missile Defense Organization (BMDO) traces its roots to the Strategic Defense Initiative (SDI) program that President Ronald Reagan started in March 1983. Overseen by the Strategic Defense Initiative Organization (SDIO), Reagan's program was to explore the technical feasibility of missile defenses in the hope that such defenses, if feasible, might provide the basis for a shift from offense-dominated deterrence to a form of deterrence that relied increasingly on strategic defenses. By 1987, there was sufficient progress in the SDI program to establish an architecture designed to defeat a major attack by Soviet Strategic Rocket Forces.

Since the Cold War ended during the administration of President George Bush, he shifted the goal of the SDI program to the development of a new architecture that would protect the United States from limited missile attacks and defend deployed American forces and U.S. allies against attacks from theater missiles. The trend toward greater emphasis on Theater Missile Defense (TMD) in this new architecture

continued into the presidency of William Clinton, which changed the name of SDIO to BMDO in May 1993. During the early years of the Clinton administration, the lion's share of Ballistic Missile Defense (BMD) funding went to TMD, with National Missile Defense (NMD) relegated to second priority and receiving only a quarter of the funding provided for TMD. By the end of President Clinton's second term, however, NMD was overshadowing TMD.

LAYING THE FOUNDATION FOR TODAY'S MISSILE DEFENSE PROGRAM

The SDI program spawned a number of significant technological advancements that underpin today's missile defense program. This is especially true with regard to hit-to-kill (HTK) technology which is the basis of all interceptors employed in today's missile defense systems. In 1984, shortly after the SDI Organization was chartered, the Army's Homing Overlay Experiment demonstrated the feasibility of intercepting a reentry vehicle in mid-course with a hit-to-kill (HTK) interceptor. Building on the Army's success, SDIO carried out a number of successful HTK programs. Included here are the small radar homing interceptor technology program, which became SDIO's Flexible Lightweight Agile Guidance Experiment, and the Exoatmospheric Reentry Vehicle Interceptor System. These programs clearly demonstrated the practicality of kinetic kill technology. Furthermore, because of the tremendous energy released when an HTK interceptor strikes its target, this approach has been judged



HERALDRY OF THE STRATEGIC DEFENSE INITIATIVE ORGANIZATION AND THE BALLISTIC MISSILE DEFENSE ORGANIZATION



The symbol of the original Strategic Defense Initiative Organization (SDIO) was a defensive shield and five stars representing the constellation Scutum, meaning shield. While the new Ballistic Missile Defense Organization (BMDO) logo contains some obvious changes, most notably the addition of symbols representing the three major services that participate in the ballistic missile defense program, it retains the shield motif to emphasize continuity of mission from SDIO to BMDO.

LAYING THE FOUNDATION FOR TODAY'S MISSILE DEFENSE PROGRAM [CONTINUED]

most effective in destroying missiles armed with nuclear, chemical, and biological warheads.

Capitalizing on the directed energy weapons (DEW) work of the Advanced Research Projects Agency and the Air Force, SDIO pushed back the frontiers of laser development to where it was possible to test a fully integrated laser system. Among SDIO's other DEW accomplishments were the development of mirror coatings that eliminated the need for heavy cooling systems and the advancement of deformable mirrors which astronomers use extensively today.

SDIO's success in miniaturizing components in virtually all areas of missile defense technology has been fundamental to progress in missile defense systems over the past decade. One example of this miniaturization is SDIO's development of small rocket motors that weighed little more than eleven pounds yet produced over ten thousand pounds of thrust.

Through its accomplishments, SDI shifted the U.S.-Soviet rivalry from ballistic missile technology where the Soviets were at least on a par with the United States to the development of missile defenses where America's edge in high technology was a decisive advantage. In the process, SDI renewed Western hope that there was an alternative to mutual assured destruction and forced Soviet leaders to recognize that they could not keep pace with U.S. missile defense efforts. As a result, restricting the SDI program became a central goal of Soviet arms control negotiators. Soviet obsession with SDI gave the United States powerful leverage in arms talks during the final years of the Cold War.

By the fall of 1987, SDIO had developed a national missile defense concept called the Strategic Defense System Phase I Architecture, which was composed of a space-based interceptor, a ground-based interceptor, a ground-based sensor, two space-based sensors, and a battle management system. With its interceptors based on HTK technology, this architecture was to destroy a given percentage of warheads in a massive Soviet missile attack against the United States. Later phases of the architecture would increase the system's operational effectiveness.

TRANSITIONING TO THE POST-COLD WAR ERA

The end of the Cold War during the presidency of George Bush brought a relaxation of tensions between America and the Soviet Union and reduced concerns about nuclear war. However, a major new threat emerged: the spread of ballistic missile technology and weapons of mass destruction throughout the world. In early 1991, this new and dangerous security environment prompted President Bush to replace the SDI Phase Architecture with a system known as GPALS (Global Protection Against Limited Strikes). The principal goal of GPALS was to defend America against limited missile attacks and protect deployed U.S. forces and American allies against shorter-range ballistic missiles. GPALS was an integrated architecture with three components: a global, space-based system of Brilliant Pebbles interceptors; a force of ground- and sea-based theater missile defenses; and a limited, ground-based national missile defense element. All interceptors in GPALS were based on the HTK principle. President Bush's decision to reorient the U.S. missile defense program was validated by the Gulf War, with its battles between Patriot and Scud missiles.

The emphasis on theater missile defenses that was part of the GPALS

BMDO TECHNOLOGY MAKES COMMERCIAL SENSE

Many corporations have incorporated BMDO-funded technology - which includes some of the most advanced innovations in the world - into their product lines, giving them the competitive edge in what is now an extremely dynamic international marketplace.

- * At least 64 companies have spun off from Federal laboratories, private companies, or universities to commercialize BMDO-funded technology
- * Roughly 393 new commercial products have resulted from BMDO-funded technologies
- * 27 companies funded by the BMDO Small Business Innovation Research program have gone public after BMDO has funded them.
- * Over 555 ventures have been formed using BMDO-funded technology as a basis
- * At least 687 patents have resulted from BMDO funding, with 220 more pending

TRANSITIONING TO THE POST-COLD WAR ERA [CONTINUED]

system was sustained under the administration of President William Clinton, but not the GPALS architecture that integrated national, theater, and space-based systems into a single architecture. As part of the new direction the Clinton administration took with regard to missile defense, on 13 May 1993, Secretary of Defense Les Aspin changed the name of SDIO to the Ballistic Missile Defense Organization (BMDO). A few months later, a new orientation for the missile defense program emerged from the Bottom-Up Review (BUR), a major study of U.S. defense requirements for the post-Cold War era. Published in the fall of 1993, the BUR laid out a missile defense program with three components that were prioritized by means of funding.



A former anti-missile site in Nekoma, North Dakota.

- The top priority of the BUR program was theater missile defense, which was to receive \$12 billion over the course of five years. Three projects constituted the core of this component: improvements to the Army's Patriot missile system (known as Patriot Advanced Capability-3 or PAC-3), a modification to the Navy's Aegis air defense system to give it the capability to intercept theater ballistic missiles (later known as Navy Area Defense or NAD), and a new Army missile defense system known as Theater High Altitude Area Defense (THAAD).
- Second priority went to national missile defense, which was to receive about \$3 billion over five years. This "technology readiness" program was designed to shorten the time required to field an effective national defense in case a new missile threat to the U.S. homeland should suddenly materialize.
- Third priority was assigned to a five-year development program to produce advanced technologies that could improve both national and theater defenses. A total of \$3 billion was earmarked for this third BUR component.

THE BUR EVOLVES: TMD AND INTERNATIONAL PROGRAMS

In addition to the three core TMD programs already mentioned, the BUR called for a fourth major program that would emerge from a competition between three projects: Corps-SAM (Surface-to-Air Missile), Navy Upper Tier, and a boost phase intercept option (such as the Air Force's airborne laser program). When Corps-SAM changed into an international program known as the Medium Extended Air Defense System (MEADS), it increased in importance and was designated a major defense acquisition program (MDAP).¹ Where Navy Upper Tier was concerned, it evolved into the Navy Theater Wide (NTW) program after it was elevated to MDAP status. The addition of MEADS and NTW to NAD, PAC-3, and THAAD meant that the BMDO TMD program now included five MDAPS instead of the four originally called for in the BUR. This produced funding strains in the overall BMD program that were aggravated by cost growths within the TMD programs themselves and by the occasional addition of smaller, unfunded requirements.

While pursuing its own TMD programs, BMDO also conducted a number of cooperative TMD programs with America's allies and friends. The longest running and most significant of these is the U.S.-Israeli Arrow missile program, which has its roots in a 1986 agreement between the United States and Israel. The missile



Central to Navy Theater Missile Defense, a Standard missile launches from USS Antietam.

THE BUR EVOLVES: TMD AND INTERNATIONAL PROGRAMS

developed through this program is a key element in the national missile defense system the Israelis are fielding as the year 2000 comes to an end. A second international program known as RAMOS (Russian-America Observation Satellite) evolved through several stages from a 1992 project. By the year 2000, RAMOS called for the Russians to build two satellites, each of which were to be fitted with U.S. sensors. These satellites would then be used to gather various phenomenological data that the two countries would share. In addition to providing valuable technical information, the project aims to help the U.S. and Russia move beyond the confrontational spirit of the Cold War. A third program grew out of U.S.-Japanese talks that began in December 1993. In response to a growing regional threat, Japan and the United States signed an August 1999 memorandum of understanding that defined four joint developmental projects related to the interceptor for the Navy's NTW program.

THE BUR EVOLVES: NMD



The Ground Based Interceptor.

Pressure for changes in the BUR's NMD program developed rather quickly after Republicans, strong supporters of national missile defense, gained control of Congress in 1994. Additional impetus came from intelligence estimates of threats against the American homeland. Responding to these forces, DoD announced in February 1996 that NMD was being changed from a technology readiness program to a deployment readiness program. Known as the "three-plus-three" program, this new approach called for BMDO to complete three more years of developmental work leading to a systems integration test in 1999. Following this test, the United States would be ready to

field a national missile defense in three more years if the threat warranted such a deployment. If a deployment were not warranted in 1999, BMDO would continue improving and refining the NMD components under development, but would always be able to deploy a system in three years following any decision to do so.

As concern about the threat to the America continued, Secretary of Defense William Cohen announced in January 1999 that DoD was adding \$6.6 billion to the NMD program to ensure that the U.S. could support a June 2000 decision to deploy. He also stated that the target date for deployment would be shifted from 2003 to 2005 to reduce program risk. The system that was to be fielded by 2005 would include twenty interceptors, a new X-band radar on Shemya

Island in the Aleutians, up-grades to already existing early warning radars, operational space-based sensors, and a command and control system. Two years later, the system would be upgraded with the addition of eighty more interceptors, allowing it to deal with a larger threat. Other planned changes would further enhance NMD's operational performance.

By the time of Secretary Cohen's announcement, a number of important developments had already occurred in the NMD program. DoD and BMDO had established the NMD Joint Program Office, which had selected Boeing North American to serve as the Lead System Integrator (LSI) to manage the integration of service developed systems. Furthermore, two highly successful tests of the candidate sensors for NMD's exoatmospheric kill vehicle (EKV) had prompted the LSI to make an early selection of the Raytheon EKV without holding the planned fly-off with Boeing's own competing EKV. The early down-selected decision saved about \$100 million, which was used to insert another test in the NMD program. This meant that there would be three intercept tests before DoD conducted an NMD Deployment Readiness Review in the summer of 2000 as a precursor to a presidential decision on the possible deployment of national missile defenses. After succeeding in its first intercept flight test in October 1999, the Raytheon EKV failed to hit its target in its next two tests, the last one coming on 8 July 2000. While top DoD officials believed that there was enough data from the five tests to conclude that the NMD system was conceptually and technically sound, the two straight test failures raised doubts at the higher levels of government about the readiness for deployment of the NMD system. These doubts were compounded by strong international opposition to an NMD deployment based upon its possible impact on the ABM Treaty.

THE ABM TREATY AND THE PRESIDENT'S DECISION NOT TO DEPLOY NMD

While the Defense Department was pushing forward with its NMD program, the State Department had been negotiating intensely with the Russians to gain acceptance for an amendment to the ABM Treaty of 1972 that would permit the United States to deploy an NMD site in Alaska. This treaty had emerged from the first round of the Strategic Arms Limitation Talks (SALT) that had begun in November 1969 and lasted two and a half years. The basic treaty limited the U.S. and Soviet Union to two missile defense sites, each having no more than one hundred interceptors. In 1974, a protocol to the treaty reduced to one the number of sites each side could deploy. Once a country deployed a defensive system at a given location, it could not deploy at any other location, even if it closed the original site. In the 1970s the Soviet Union established its one ABM facility at Moscow, a facility that Russia continues to operate. The United States established Grand Forks, North Dakota, as its one site, but closed its Safeguard NMD system in February 1976, a few months after the system first became operational.



Under the Reagan and Bush administrations, American arms negotiators had used the so-called broad interpretation of the ABM Treaty as a wedge for opening negotiations with the Soviets on a possible regime of arms agreements and cooperative programs to pave the way for a transition from offense-dominated nuclear deterrence to a deterrence paradigm based increasingly on strategic defenses.² The Clinton administration opted for another approach. It dismissed the broad interpretation of the treaty in 1993 and focused its energies on “strengthening” the ABM Treaty, which, the administration emphasized, was a cornerstone of strategic stability in the post-Cold War world. In pursuit of this policy, American diplomats negotiated the multilateralization of the ABM Treaty and secured a demarcation agreement that provided criteria for distinguishing TMD systems (not covered in the original treaty) from NMD systems.

By 26 September 1997, when these two changes were finally agreed to, the Administration’s policy and negotiating efforts had aroused strong opposition in the Republican-dominated Congress. The Senate demanded the right to offer its advice and consent on the amendments and almost certainly would have rejected the agreements had they been submitted for approval. Furthermore, in fiscal year 1999 and again in fiscal year 2000, Congress passed measures requiring presidential certification that the demarcation and multilateralization agreements were not being implemented before funds could be expended to support U.S. participation in the Standing Consultative Commission that had been established by the ABM Treaty.

By the time Congress moved to block the implementation of the multilateralization and demarcation agreements, the time was approaching when it would be necessary to initiate long lead time activities if the U.S. were to have an NMD system operational in time to meet the projected threat from rogue nations such as North Korea. Since NMD plans called for constructing a new X-band radar on Shemya Island and deploying an NMD site in Alaska, the United States would have to negotiate with Russia to amend the ABM Treaty.



When the Clinton administration began its efforts to amend the treaty, it met strong opposition from the Russians, who protested that the treaty was the cornerstone of strategic stability and could not be amended. In their protests, the Russians were supported strongly by elements of the international community, including China, France, and the United Nations. Furthermore, during the summer of 2000, as the deadline approached for President Clinton’s decision on whether or not to initiate an NMD deployment, the Russians played their trump card. Under the leadership of newly elected President Vladimir Putin, the Russian Duma approved in quick succession the START II strategic arms agreement and the Comprehensive Test Ban Treaty. The former had been agreed to by Presidents George Bush and Boris Yeltsin in 1993 and approved by the U.S. Senate in 1996. From this putative “moral high ground” the Russians now threatened to scrap the entire arms control structure if the United States insisted on changing or withdrawing from the ABM Treaty.

THE ABM TREATY AND THE PRESIDENT'S DECISION NOT TO DEPLOY NMD [CONTINUED]

Stout Russian resistance to amending the ABM Treaty and NMD test failures were important considerations in intense, high-level government deliberations that were carried out in the weeks following the IFT-5 test. These deliberations involved representatives of the State Department, the Department of Defense, and the National Security Council and included the proceedings of DoD's own Deployment Readiness Review of the NMD program. Based on the advice that flowed from these deliberations, President Clinton decided not to initiate an NMD deployment, announcing his decision in a 1 September 2000, speech at Georgetown University. In his remarks, the President noted that the world was, indeed, becoming in some ways a more dangerous place so that pursuing an NMD system was rational. Nevertheless, given the fact that the NMD program was still showing signs of technological difficulties and that all of America's security measures, including arms control, must complement each other, he had decided that the time was not right for a deployment. Moreover, given the technical difficulties, he believed that his decision to defer the NMD decision to the next president would not significantly delay the operational date of an American NMD system.

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CONCLUSION: A WAY AHEAD

Over the past fifteen years, America's national security requirements have changed dramatically as the world moved through the final decade of the Cold War and into a multi-polar world marked by the proliferation of ballistic missile technologies. Throughout this time, BMDO and its predecessor organization have led a focused, concerted effort to develop missile defenses that could match America's changing security requirements.

As a result of these efforts, the United States is positioned technologically to meet the challenges of a new strategic environment that includes growing threats from improved theater ballistic missiles and the spread of ICBMs to hostile nations that previously posed no strategic threat to the U.S. homeland. The United States already has available Patriot PAC-2 missiles that have been improved considerably since the Gulf War. The Israeli Arrow missile is becoming operational as the year 2000 draws to a close. The first Patriot PAC-3 unit, equipped with an all new hit-to-kill interceptor, will be fielded during the final quarter of FY2001. Within two years of PAC-3's operational debut, the first Navy Area Defense unit is scheduled to be deployed. In the more distant future, THAAD and Navy Theater Wide will be coming on line, adding a second, overarching, protective layer to the defenses already provided by NAD and PAC-3. At the same time, work on national missile defenses continues apace so that BMDO is prepared to move this program in whatever direction the new President selects.

Looking ahead into the uncertainty of the twenty-first century lends a special poignancy to the words of America's patriarch, George Washington: "To be prepared for war is one of the most effectual means of preserving peace." Because of the important advances in missile defenses over the past decade and a half, the United States can look forward with hope to a new world of peace and prosperity while remaining confident that its defenses are ready for any conflict the future might bring.

ENDNOTES

1. In order to be an MDAP, an acquisition program must either be designated by the Under Secretary of Defense for Acquisition, Technology, and Logistics as an MDAP or estimated by the USD(AT&L) to require an eventual total expenditure for research, development, test, and evaluation of more than \$355 million in FY 1996 constant dollars or, for procurement, a total expenditure of more than \$2.135 billion in FY 1996 constant dollars. Once a program is designated an MDAP it is managed through a defined process that includes several phases such as concept exploration and definition, demonstration and validation, and engineering and manufacturing. Before an MDAP can pass from one phase of the process to another, the program must meet established exit criteria such as the successful completion of a given number of tests. Transitions between phases are known as milestones and are designated by capital Roman numerals. For example, MSI marks the transition from concept exploration and definition to the demonstration and validation phase.

2. The expression, broad interpretation of the ABM Treaty, derives from an intense debate in the 1980s over the interpretation of certain provisions in the treaty pertaining to futuristic systems that were based on technologies not used in the components and systems described and controlled in the ABM Treaty. These futuristic systems were said to be based on "other physical principals." Supporters of the "broad" interpretation argued that the treaty anticipated the development of futuristic systems and did not agree to restrain research, development, and testing associated with these new systems. Advocates of the "narrow" or "restrictive" interpretation held that the treaty prohibited the development, testing, and fielding of all but fixed land-based ABM systems, regardless of the technologies upon which they were based. The debate raged throughout much of the eighties and was never really resolved before the end of the Cold War, since the administrations of both President Ronald Reagan and President George Bush adhered to the narrow interpretation. For one discussion of the broad-versus-narrow issue by a participant in the SALT I talks, see Paul H. Nitze with Anna M. Smith and Steven L. Rearden, *From Hiroshima to Glasnost: At the Center of Decision* (New York: Grove Weidenfeld, 1989), p. 414.